

# Nutrition Analysis of Forage Plants and Foraging Behavior of Mongolian Gazella<sup>1</sup>

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**Abstract** The study on winter food constitution of Mongolian gazella (*Procapra gutturosa*) was conducted in Hulunbeir grassland (Xinbarhuyou Banner, Hulunbeir League, Inner Mongolia) from spring 1994 to summer 1995. With microhistological analysis technique of feces, 21 plant species were identified to be available for Mongolian gazella as forage in winter and their nutritive trait were analyzed. Some foraging behavior of Mongolian gazella were also discribed.

**key words:** *Procapra gutturosa*, Mongolian gazella, Foraging plant, Nutrition, Foraging behavior

## Nutrition Analysis of Foraging Plant

Nutrition analysis on winter food constitution of Mongolian gazella (*Procapra gutturosa*) in Hulunbeir grassland was made by use of the microhistological analysis technique of feces. The results showed that 21 plant species (genus) were available to Mongolian gazella in winter (Table 1). From Table 1, we could conclude that the *Gramineae* is the staple food for Mongolian gazella in winter.

**Table 1. Winter food constitution of Mongolian gazella**

Plant species	Proportion (%)	Plant species	Proportion (%)
<i>Kalidium foliatum</i>	1.4	<i>Achnatherum splendens</i>	1.2
<i>Suaeda glauca</i>	1.9	<i>Agropyron cristatum</i>	4.2
<i>Reaumuria soongorica</i>	T	<i>Aneurolepidium chinense</i>	21.8
<i>Potentilla</i> sp.	T	<i>Festuca</i> sp.	1.8
<i>Astragalus melioides</i>	T	<i>Koeleria cristata</i>	3.1
<i>Astragalus adsurgens</i>	2.3	<i>Stipa</i> sp.	38.6
<i>Caragana microphylla</i>	7.5	<i>Cleistogenes squarrosa</i>	1.5
<i>Lespedeza davurica</i>	T	<i>Setaria viridis</i>	2.6
<i>Meilotos suaveloens</i>	T	<i>Allium prostratum</i>	T
<i>Artemisia axycephala</i>	2.7	<i>Allium senescens</i>	1.2
<i>Artemisia frigida</i>	3.6	Total	100

\*T: means one foraging plant's percentage of all foraging plants.

*Achnatherum splendens*, which distributes in lake-side and salinized lowland, belongs to thick and bulky grass. Its height is over 100 cm. It is tall, coarse, less palatable and has moderate value in nutrition. The foraging rate of *Achnatherum splendens* by Mongolian gazella is not high.

*Aneurolepidium chinense* is a kind of moderate broad-leaf grass, with moderate height (leaf layer is 30~40 cm. reproduction branch is 50~70 cm). Its leaf surface is relatively wide. The ecological amplitude of

this species is between arid and middle. *Aneurolepidium chinense* is called "the first-class fodder" by herdsmen because it has high crude protein content with functions of restoring physical strength in spring and fattening the animal in summer. This grass species has a natural significance to Mongolian gazella for its better remains in winter, relatively high nutritive value, better palatability and higher proportion in the distribution area of Mongolian gazella.

*S. grandis*, *S. baicalensis*, *S. krylovii* are the most important setting up and dominant species in Hulunbeir grassland, belonging to moderate thin-leaf grasses. The area of grassland formed by these kinds of plants is the largest, compared to other kinds of grassland type. *S. grandis* is staple food to livestock for its superior remains in winter. However, the foraging rate of *Stipa* spp. is low in autumn as a result of that the animals are always hurt by the thorn of its mature fruit.

*Festuca* sp. *Koeleria cristata*, *Cleistogenes squarrosa*, *Agropyron cristatum*, with thin, dry and soft leaves, are classified as perennial, arid, thin, cluster grass. They usually form profuse "undergrass layer" under the moderate grass. They are partly covered by the snow in winter, so it is difficult to forage them. The nutritive value of these kinds of grass is superior.

*Setaria viridis* is an annual little grass, 5~10 cm in height, growing quickly, with short life cycle, and has superior nutritive value. Its size varied with the amount of precipitation.

*Meilotos suaveloens* is a moderate legume. it contains high proportion of crude protein and the nutritive value is high. It is over 40 cm high.

*Astragalus melioides* belongs to arid, thin leg-

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umes. It generally reaches 60~70 cm high. It is not a dominant species on the grassland but common and accompanying species to herb group. Its nutritive value is good.

*Caragana microphylla*, extremely abundant in Hulunbeir grassland, is a thorny legume shrub with good nutritive value. It is a forage taken by Mongolian gazella throughout the year, but more taken in spring. In winter, Mongolian gazella push the snow aside to eat the part beneath snow when ground part were eaten up.

*Artemisia frigida* is classified as short, semi-arid shrub, *Artemisia*. It is over 40 cm in height, sprouts early in spring, and falls leaves late in autumn. It has good remains in winter, and nutritive value is good. It is foraged by Mongolian gazella over the year.

*Artemisia axycephala* is a semi-arid and sandy shrub, *Artemisia*, and has moderate nutritive value.

*Reaumuria soongorica*, which can endure salty and gravelly environment, is a little, semiarid shrub, Tamaricaceae, with moderate nutritive value. It contains relatively high proportion of crude protein and the highest proportion of salt in the growing peak.

*Kalidium foliatum*, which is tasted bitter and salty and contains high quantity of moisture and salt, is a juicy, semi-arid shrub, Chenopodiaceae. Its nutritive value is low. Mongolian gazella feed on a little amount of this plant in winter for supplement of salt.

*Potentilla* belongs to weed with general nutritive value. It is taken little by Mongolian gazella over the year. The foraging rate in spring is higher than that of in autumn and winter.

*Allium prostratum* and *Allium senescens*, which are abundant in Hulunbeir grassland, belongs to *Allium*, with high nutritive value. It contains relatively high proportion of crude protein in green state and high proportion of fat during fruit period. It is taken by Mongolian gazella throughout the year. The foraging rate in autumn and summer is higher than that in spring and winter.

## Foraging behavior

With field observation, we found that the soft parts such as tender leaf and stem tip are favorite food to Mongolian gazella. By cutting the stomach of Mongolian gazella open in the late of April, we found that the green part of budding vegetation eaten by the animal took up a large proportion. These food that can be distinguished include *Carex duriuscula*, *Agropyron cristatum*, *Koeleria cristata*, *Stipa*, *Cleistogenes squarrosa*, *Caragana microphylla*. The leaves and the stems had been mixed in stomach. Most of them were about 1~3 cm in length, some could be over 5 cm. In the late of December, An individual plant of

*Caragana microphylla* was found among dozens of Mongolian gazella' crouch trace on snow field near No. 37 Frontier Inspection Station in Xinbarbuyou Banner between the boundary of P. R. China and Mongolia. The remains of the branch bit by Mongolian gazella was 20 cm in length or so. Furthermore, in order to eat the twig, Mongolian gazella pushed the snow aside to form a trace about 30 cm wide and 40 cm long surrounding the *Caragana microphylla*, hence the whole of the grass was displayed. From the herdsmen, we knew that the flowers of this kind of plant are also foraged by Mongolian gazella in June.

In June, Mongolian gazella begin to forage at 3:00 a.m. and continue to dawn. Mongolian gazella lives in group, few live individually. The group size varied greatly from several to hundreds. It is common to see tens or dozens of Mongolian gazella in one group. The individuals of one group graze at the same place, not far from each other. When they meet disturbance, one of them escaping first, then the others follow, and gradually they form a line. Sometimes they escape to all directions.

The coverage of plants distributing in the foraging area of Mongolian gazella is large in common. Measurement to three foraging samples (10cm x 10cm) near the boundary beside the Kelulun River shows that the plant coverage is 65%, 85%, 70% respectively.

The stomach content weights of four Mongolian gazella hunted in early June were measured. The result was as follows: No.1. male (yearling): 1925 g; No. 2. male (yearling): 2150 g; No. 3. female (without fetus): 2125 g; No. 4. female (with fetus): 2450 g. The mean weight of the stomach content was 2162.5 g.

It is difficult for Mongolian gazella to consume a large amount of energy to excavate soil layer to eat the plant root because of the hard soil of the grassland in Xinbarbuyou Banner. It hasn't been found that the animal excavated the soil to feed on grass root. The local herdsmen held the same opinion. We need further observation to determine if Mongolian gazella feed on the grass root in the food shortage period.

In winter, Mongolian gazella lick snow to supplement water, and they also feed on the grasses which have high proportion of salt such as *Kalidium foliatum* to meet the body's requirement of salt, but the quantity of foraging isn't so much.

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